Booz Allen
VSBI
2-7-85

AFMI SW	84	89	AACN
TOTAL			
ASW	4.9	17.1	28%
SW	4.0	12.4	25%
TOTAL SW	8.9	29.5	27%
INTEGRATED APPL-DBMS (AFMI)	0.2	4.3	85%
% INT A-DBMS OF TOT SW	2%	15%	

Talked to
Betty Feezor FIN
person =

New — PART

Anac B
2-11-85

MSA —
1984 56.4M 11.2M (w/o PT) 3.2M vs 10.3M
1983 47.3M
1984 = 141.8M +243M
1983 = 117.4M +10.8M

discount = (13.5)
PTREE

INFLATION - MARE

	CONV. RATE	CURRENT INF RATE	FUTURE INF
UK	.75	5.3%	5.0
WG	2.82	2.6%	3%
FR	.866	9.3%	9.0%
IT	1730	10.5%	10.0
US		3.8%	
US			5%

* includes INF RATE vs U.S.

	1983 GNP
FR	510 B
IT	386 B
UK	447 B
WG	148 B
W. E TOT	1.99 T
US	3.3 T

21%

NCA problem → AVAERA → domain verification = new
- ACV - VARA (write off ACV
  exp up
- rewrite SW for KAY-AP+O
- new facility - costly

EUROPE

MARE

SP-

	84	89	AACR	CONV TO $ PER KGS	CONV TO $ US EQUIV
FRANCE (FF)	5.9 B .590	25.5 B 2.55	34%	9.67	.10
U.K.	.5 £ .650	1.9 £ 2.47	31%	.88	(1.3)
W. GERMANY	2.0 B DM .63	7.8 B DM 2.46	31%	3.16	(.316)
ITALY	719 ~~[illegible]~~ .36	3820 ~~[illegible]~~ L 1.91	40%	1950	.0005
TOTAL	2.230	9.38			

YSBI -
Tant
TUDU

EXHIBIT VII-3

SOFTWARE PRODUCTS MARKET FORECAST, 1984-1989
-- FRANCE

SUBSECTOR	MARKET FORECAST (French Francs (FF) Millions) 1983	1984	1983-1986 AAGR (Percent)	1986	1986-1989 AAGR (Percent)	1989
Hardware Manufacturers						
Systems	2,168FF	2,735FF	26.1%	4,346FF	26.1%	8,804FF
Applications	383	490	28.6	812	29 28.8	1,736
Subtotal	2,551FF	3,225FF	26.4%	5,158FF	27 26.9%	10,540FF
Independents						
Systems	625FF	843FF	34.9%	1,510FF	32 31.8%	3,446FF
Applications	1,155	1,833	53 52.7	4,114	41 40.8	11,487
Subtotal	1,780FF	2,676FF	47 46.7%	5,624FF	38.5%	14,933FF
Total Market						
Systems	2,793FF	3,578FF	28.1%	5,856FF	28 27.9%	12,250FF
Applications	1,538	2,323	47.1%	4,926	39.0	$13,223
Total	4,331FF	5,901FF	35.1%	10,782FF	33.2%	25,473FF

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EXHIBIT VII-4

SOFTWARE PRODUCTS MARKET FORECAST, 1984-1989

ITALY

SUBSECTOR	MARKET FORECAST (Lira (£) Millions) 1983	1984	1983-1986 AAGR (Percent)	1986	1986-1989 AAGR (Percent)	1989
Hardware Manufacturers						
Systems	£276	£362	31.9%	£ 634	30.0%	£1,393
Applications	69	90	34.8	168	30.4	372
Subtotal	£345	£452	32.5%	£ 802	30.0%	£1,765
Independents						
Systems	£ 67	£118	54.7%	£ 248	31.0%	£ 560
Applications	79	149	77.9	445	49.8	1,495
Subtotal	£146	£267	73.7%	£ 693	43.7%	£2,055
Total Market						
Systems	£343	£480	40.6%	£ 882	30.0%	£1,953
Applications	148	239	60.4%	613	45.0%	1,867
Total	£491	£719	47.1%	£1,495	36.7%	£3,820

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EXHIBIT VII-5

SOFTWARE PRODUCTS MARKET FORECAST, 1984-1989

UNITED KINGDOM

SUBSECTOR	MARKET FORECAST (£ Millions) 1983	1984	1983-1986 AAGR (Percent)	1986	1986-1989 AAGR (Percent)	1989
Hardware Manufacturers						
Systems	£187	£231	23.1%	£349	24.8%	£ 671
Applications	41	52	26.4	83	27.2	170
Subtotal	£228	£283	24. 23.7%	£432	25 24.9%	£ 841
Independents						
Systems	£ 30	£ 48	50.1%	£102	33 32.8%	£ 239
Applications	108	166	45.1%	332	33.1%	786
Subtotal	£138	£214	46.5%	£434	33.1%	£1,025
Total Market						
Systems	£217	£279	28 27.6%	£451	26.1%	£ 910
Applications	£149	£218	41 46.7%	£415	32.0%	£ 956
Total	£366	£497	33.1%	£866	29.2%	£1,866

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EXHIBIT VII-6

SOFTWARE PRODUCTS MARKET FORECAST, 1984-1989
WEST GERMANY

SUBSECTOR	MARKET FORECAST (Deutsche Marks (DM) Millions)					
	1983	1984	1983-1986 AAGR (Percent)	1986	1986-1989 AAGR (Percent)	1989
Hardware Manufacturers						
Systems	818DM	1,014DM	24%	1,562DM	24%	3,009DM
Applications	153	185	28 ~~27.6~~	318	26	639
Subtotal	971DM	1,199DM	25 ~~24.6%~~	1,880DM	25 ~~24%~~	3,648DM
Independents						
Systems	148DM	214DM	42 ~~41.6%~~	420DM	35 ~~34.9%~~	1,030DM
Applications	374	555	45 ~~44.9~~	1,138	40	3,135
Subtotal	522DM	769DM	44.~~3%~~	1,558DM	39 ~~38.8%~~	4,165DM
Total Market						
Systems	966DM	1,228DM	27	1,982DM	27 ~~26.8%~~	4,039DM
Applications	527	740	40	1,456	37 ~~37.4~~	3,774
Total	1,493DM	1,968DM	30%	3,438DM	32 ~~31.5%~~	7,813DM

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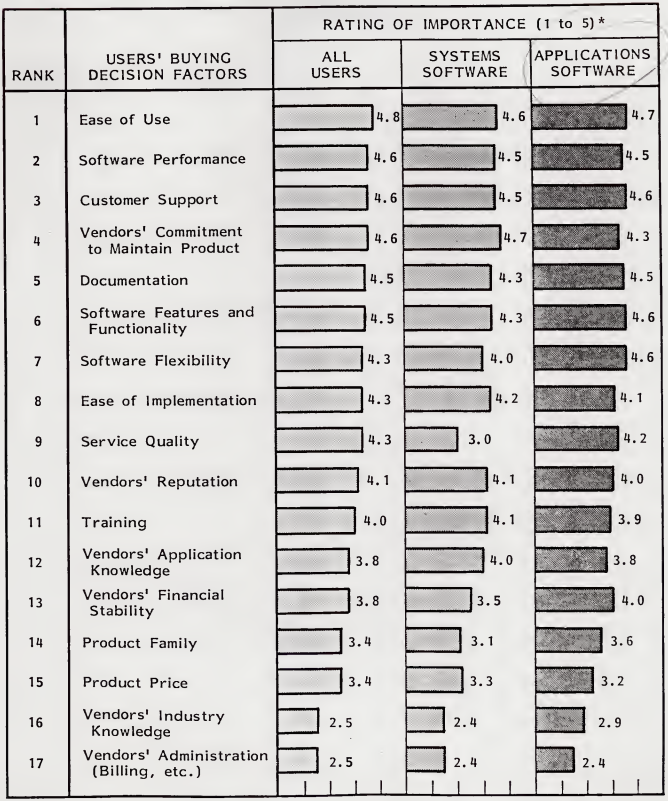
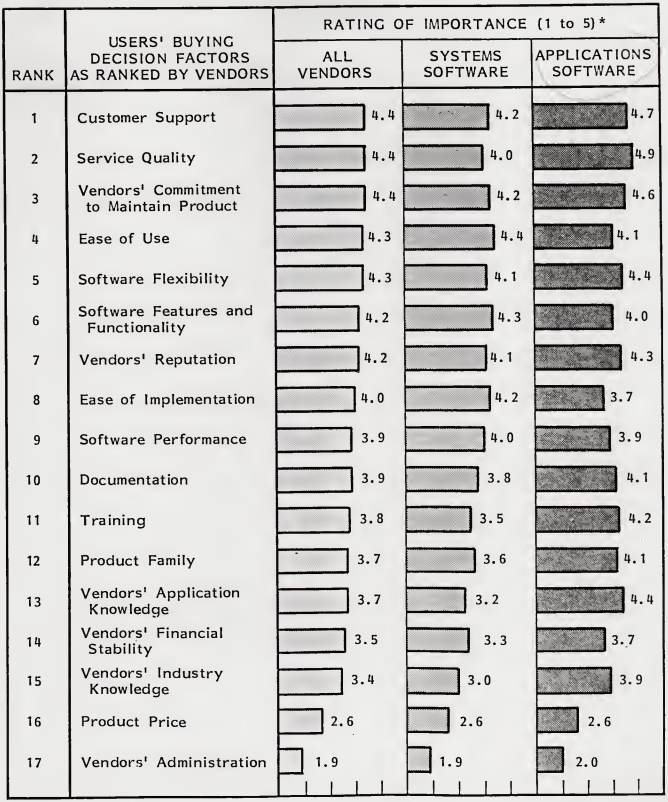
USERS' RATINGS OF THE MOST IMPORTANT FACTORS
CONSIDERED IN BUYING SOFTWARE


RANK
USERS' BUYING DECISION FACTORS
RATING OF IMPORTANCE (1 to 5)*
ALL USERS
SYSTEMS SOFTWARE
APPLICATIONS SOFTWARE
1 Ease of Use 4.8 4.6 4.7
2 Software Performance 4.6 4.5 4.5
3 Customer Support 4.6 4.5 4.6
4 Vendors' Commitment to Maintain Product 4.6 4.7 4.3
5 Documentation 4.5 4.3 4.5
6 Software Features and Functionality 4.5 4.3 4.6
7 Software Flexibility 4.3 4.0 4.6
8 Ease of Implementation 4.3 4.2 4.1
9 Service Quality 4.3 3.0 4.2
10 Vendors' Reputation 4.1 4.1 4.0
11 Training 4.0 4.1 3.9
12 Vendors' Application Knowledge 3.8 4.0 3.8
13 Vendors' Financial Stability 3.8 3.5 4.0
14 Product Family 3.4 3.1 3.6
15 Product Price 3.4 3.3 3.2
16 Vendors' Industry Knowledge 2.5 2.4 2.9
17 Vendors' Administration (Billing, etc.) 2.5 2.4 2.4
1 2 3 4 5 1 2 3 4 5 1 2 3 4 5

* Rating: 1 = Low, 5 = High

RESPONDENT SOFTWARE PRODUCT VENDORS' RATINGS OF
THE MOST IMPORTANT FACTORS CONSIDERED BY CUSTOMERS


RANK
USERS' BUYING DECISION FACTORS AS RANKED BY VENDORS
RATING OF IMPORTANCE (1 to 5)*
ALL VENDORS
SYSTEMS SOFTWARE
APPLICATIONS SOFTWARE
1 Customer Support 4.4 4.2 4.7
2 Service Quality 4.4 4.0 4.9
3 Vendors' Commitment to Maintain Product 4.4 4.2 4.6
4 Ease of Use 4.3 4.4 4.1
5 Software Flexibility 4.3 4.1 4.4
6 Software Features and Functionality 4.2 4.3 4.0
7 Vendors' Reputation 4.2 4.1 4.3
8 Ease of Implementation 4.0 4.2 3.7
9 Software Performance 3.9 4.0 3.9
10 Documentation 3.9 3.8 4.1
11 Training 3.8 3.5 4.2
12 Product Family 3.7 3.6 4.1
13 Vendors' Application Knowledge 3.7 3.2 4.4
14 Vendors' Financial Stability 3.5 3.3 3.7
15 Vendors' Industry Knowledge 3.4 3.0 3.9
16 Product Price 2.6 2.6 2.6
17 Vendors' Administration 1.9 1.9 2.0
1 2 3 4 5 1 2 3 4 5 1 2 3 4 5

* Rating: 1 = Low, 5 = High

ASYNCHRONOUS DISPLAY TERMINAL SALES AND DISTRIBUTION PRACTICES

INPUT
PARK 80 PLAZA WEST ONE
SADDLE BROOK, NJ 07662
(201) 368-9471

MAY 27, 1983

ASYNCHRONOUS DISPLAY TERMINALS
SALES AND DISTRIBUTION PRACTICES

MANUFACTURERS INTERVIEWED

COMPANY	POSITION
Ann Arbor Terminals	Vice President, Operations
Applied Digitial Data Systems (ADDS)	
Beehive International	Vice President, Sales
C. Itoh Electronics	
Data General	Marketing Manager
Digital Equipment	Marketing Manager
Esprit Systems (Hazeltine)	Director, Product Marketing
General Terminal (INFOTON)	Vice President, Marketing
Hewlett-Packard	
Honeywell	Director, Terminals Marketing
Intelligent Systems (INTECOLOR)	Manager, Marketing Communications Advertising Manager
Lear Siegler	Director, Marketing
Micro-Term	
Qume	Director, Marketing
Soroc Technology	Marketing Manager
Teletype	
TeleVideo Systems	Product Support Specialist
Visual Technology	Marketing Manager
Wyse Technology	
Zentec	Vice President, Marketing

ASYNCHRONOUS DISPLAY TERMINAL
SALES AND DISTRIBUTION PRACTICES

DISTRIBUTORS INTERVIEWED

COMPANY	POSITION
Arrow Electronics	Director, Marketing
Carterfone Communications	Vice President
DJC Corp.	Vice President, Marketing
Hall-Mark Electronics	Vice President, Marketing
Kierulff Electronics	Vice President, Marketing
Schweber Electronics	Director, Computer Products

RESPONDENT PROFILE BY POSITION

	NUMBER	PERCENT
Vice President	8 9	40% 37
Director	6	30% 25
Manager	5 8	25% 33
Product Specialist	1	5% 4
TOTAL	20 24	100%

RESPONDENT PROFILE
MANUFACTURERS

PRODUCT CATEGORY	RESPONDENTS NUMBER	PERCENT*
Dumb Terminal	6	43%
Smart/Editing Terminal	13	93%
Intelligent Terminal	5	36%
Other	1	7%

*Based on 14 companies interviewed.

TERMINAL CATEGORIES
BY MANUFACTURER RESPONDENT

COMPANY	DUMB	SMART	INTELLIGENT
Ann Arbor Terminals		4	
Beehive International	10	3	6
Data General	2	2	
Digital Equipment	3	1	
Esprit Systems (Hazeltine)	2	4	
General Terminal (INFOTON)		2	
Honeywell		3	
Intelligent Systems (INTECOLOR)		2	10
Lear Siegler	3	7	
Qume		3	
Soroc Technology		2	2
TeleVideo Systems	1	5	1
Visual Technology		5	
Zentec			10

ASYNCHRONOUS DISPLAY TERMINAL SALES AND DISTRIBUTION PRACTICE

PRODUCT CATEGORY	PERCENT OF UNITS SHIPPED*		
	MFG.	DIST.	COMB.
Dumb Terminal	36	32	35
Smart/Editing Terminal	44	48	45
Intelligent Terminal	20	20	20
	100%	100%	100%

*Based on responses from:
10 Manufacturers
5 Distributors

RESPONDENT PROFILE
MANUFACTURERS

DISTRIBUTION CHANNELS

CHANNEL USED	PERCENT OF RESPONDENTS
Distributors Only TeleVideo	7%
Distributors and 3rd Party Esprit (Hazeltine) Qume Soroc Visual Technology	29%
3rd Party and End User Zentec	7%
Distributors, 3rd Party and End User Ann Arbor Beehive Data General Digital Equipment General Terminal Honeywell Intecolor Lear Siegler	57%
	100%

DISTRIBUTOR RANKING

COMPANY	RANK
Hamilton Avnet	1
Arrow	2
D JC	3
Kierulff	4
Hall-Mark	5
Schweber	6
Wyle	7
Carterfone	8

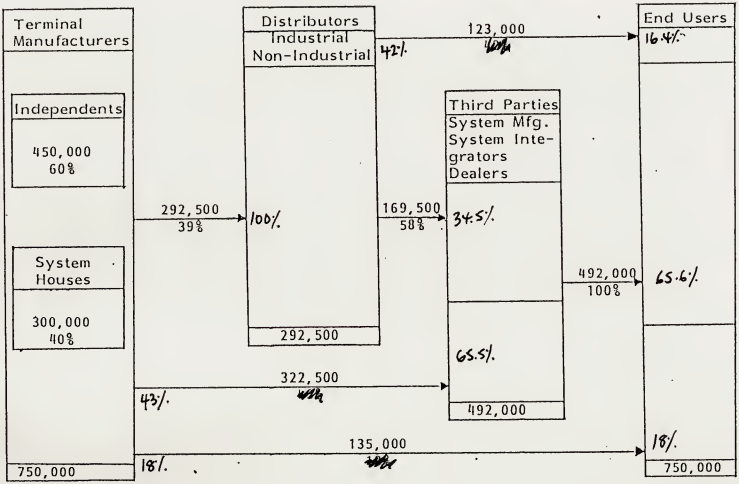
ESTIMATED SHIPMENTS OF
ASYNCHRONOUS DISPLAY TERMINALS*

	IBM ANALYSIS 1981	IBM ANALYSIS 1982	INPUT RESEARCH 1982
INDEPENDENT MANUFACTURERS			
TeleVideo	42	73	higher
ADDS	54	68	same**
Lear Siegler	38	45	higher
Esprit (Hazeltine)	23	26	higher
Soroc	20	23	lower
Beehive	19	19	higher
Visual Technology	14	16	higher
Ann Arbor	11	12	lower
SYSTEM MANUFACTURERS			
DEC	80	96	higher
All Others	224	241	same**
TOTAL	525	619	750

* Units in thousands

** Within 10%

ASYNCHRONOUS DISPLAY TERMINAL
SALES AND DISTRIBUTION PRACTICES
ESTIMATED UNITS SHIPPED - 1982



ASYNCHRONOUS DISPLAY TERMINALS
CHANGES IN PAST TWO YEARS

FACTOR	PERCENT OF RESPONDENTS
Price erosion and margin squeeze	56%
Increased intelligence, functionality and reliability	44%
Color and graphics	28%
Offshore manufacturing	22%
ANSI X3.64	17%
Importance of distributors	6%
Improved ergonomics	6%

ASYNCHRONOUS DISPLAY TERMINALS CHANGES IN NEXT TWO YEARS

FACTORS	PERCENT OF RESPONDENTS
Color and graphics	61%
Increased price performance	56%
Offshore manufacturing	17%
Importance of distributors	17%
ANSI X 3.64	11%
Improved ergonomics	11%
Voice input	6%
Moves from Displays to PC's	6%
Battle for market share	6%

ASYNCHRONOUS DISPLAY TERMINALS CHANGES IN DISTRIBUTION

- MANUFACTURERS TO USE DISTRIBUTORS EVEN MORE
- NON-INDUSTRIAL DISTRIBUTORS TO BE ACQUIRED BY MANUFACTURER'S AND INDUSTRIAL DISTRIBUTORS
- DISPLAY TERMINALS WILL BECOME A CATALOG ITEM
- MARKETING STRATEGY WILL CHANGE FROM "PUSH" TO "PULL"

ASYNCHRONOUS DISPLAY TERMINAL
SALES AND DISTRIBUTION PRACTICES

CONCLUSIONS

- DISPLAYS WILL CONTINUE TO BECOME MORE INTELLIGENT
- UNITS SHIPPED WILL SHIFT FROM DUMB TO INTELLIGENT
- TREND TO OFFSHORE MANUFACTURING WILL CONTINUE
- MARGIN SQUEEZE WILL FORCE MORE EFFECTIVE USE OF DISTRIBUTORS
- U.S. COMPANIES WILL BECOME BASICALLY MARKETING ARMS
- PRICES WILL CONTINUE TO DROP
- COLOR GRAPHICS AND ANSI WILL BE FACTORS
- DISPLAY UNIT GROWTH WILL BE IN THE 25-35% RANGE
- SURVIVORS BY 1986 WILL INCLUDE (PERHAPS LIMITED TO):
  - DEC
  - TELEVIDEO
  - ADDS
  - JAPAN INC.

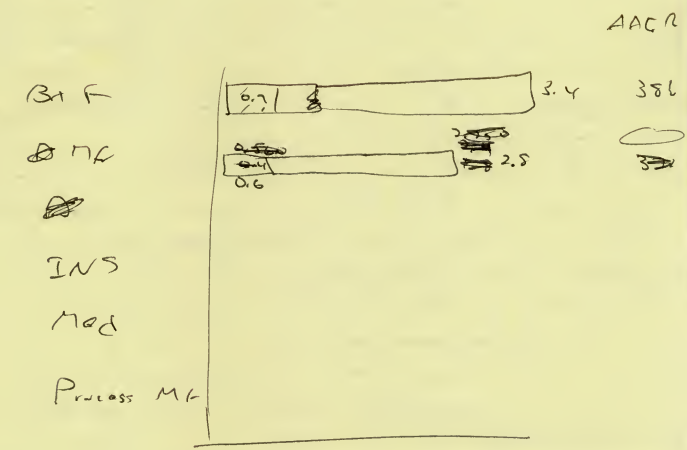
Back Up

2.5-85

I-5 ASW

	84	89	AAER
Bus F			
M.M	0.7	3.4	38
PC	.08	.6	50
TOT	0.78	4.0	39%
MFR			
OM			
M.M	0.4	1.8	37
PC	.04	.26	47
TOT	0.44	2.06	36%
PM			
M.M	.1	.6	37
PC	.02	.09	50
TOT	.12	.69	
TOT MFR	.56	2.75	37%
DISTR			
MM	0.3	1.6	36
PC	.05	.310	47
TOT	0.35	1.91	40%
INS			
M.M	0.4	1.2	36
PC	.04	.19	39
TOT	0.44	1.39	26%
MED M.M	0.2	1.0	36
PC		.18	50
TOT	.02		
	0.22	1.18	40%

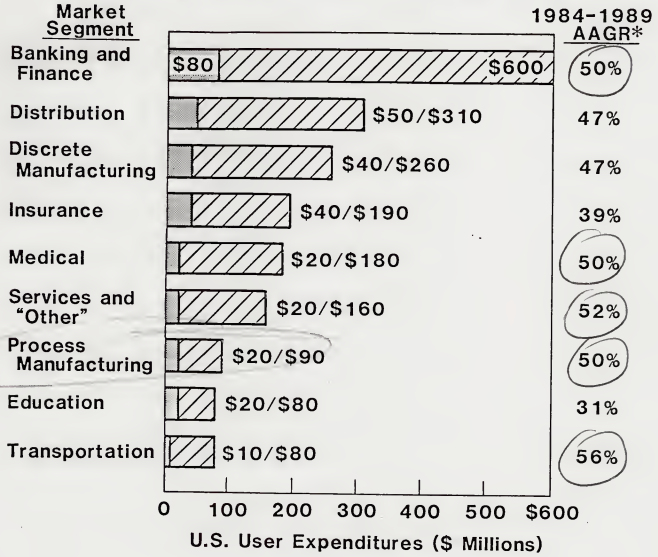
I-9 ASW MRTS

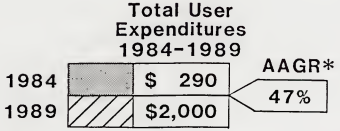


		84	89	AACR
M.M				
DM	– M.M	0.4	1.8	
	– PC	0.040	0.260	
	TOT	0.440	2.060	
PM	M.M	0.1	0.6	
	PC	0.020	0.090	
	TOT	0.120	0.690	
MFR TOT		0.560	2.750	
round-bbl		0.6	2.8	

PC(?)

MULTIPLE HIGH-GROWTH OPPORTUNITIES EXIST WITHIN INDUSTRY-SPECIFIC MARKETS





*Average Annual Growth Rate

Note: All Dollars Rounded to Nearest $10 Million

	84 Mac	89	84 B-200 Micro	89	84 VSE LAN	89
PLANNING AND ANALYSIS	$0.6	$2.0	$330	$1,940	.93	3.94
ACCOUNTING	$1.0	$2.2	$170	$1,100	1.17	3.3
OTHER CROSS INDUSTRY	$0.2	$0.4	$160	$.560	.34	.96
EDUCATION/TRAINING	$0.03	$0.1	$40	$.360	0.07	.46
ENGINEERING & SCIENTIFIC	$0.02	$0.4	$30	$.130	0.05	.53
HUMAN RESOURCES	$0.4	$0.9	$30	$.120	.43	1.02

K-I

2.585

	TOTAL $4.89 AACR	MAINFRAME 1984	MAINFRAME 1989	MICRO 1984	MICRO 1989	TOTAL 1984	TOTAL 1989
PLANNING AND ANALYSIS	33%	$0.6	$2.0	$.330	1.940	.93	3.9
ACCOUNTING	22%	$1.0	$2.2	$.170	1.100	1.2	3.3
OTHER CROSS INDUSTRY	20%	$0.2	$0.4	$.160	.560	.40	1.0
EDUCATION/TRAINING	38%	$0.03	$0.1	$.040	.40	.10	.50
ENGINEERING AND SCIENTIFIC	18%	~~$0.2~~ 0.3	$0.4	$.030	.130	~~.23~~	.53
HUMAN RESOURCES	18%	$0.4	$0.9	$.030	.120	.43	1.0

Back up
YSBS
2.7.85

estimate

CUCUMET

	3 Qtr TO DATE 1985	1984	Diff	%
~~3 QTRS~~	768	1189	-421	~~35.4%~~

1985 Rec - Assume 1984 = 160M
- 1985 = 1984 x 140%
= 224M

CUCT says ASW = 25% (224) = 56M
MPC ASW = 80% (56M) = 34M

1984 ASW = 15% x 160 = 24M
Assume MK co = 60? (24) = 141K

Displays 2552

1982

CS

New Drag Term

1982 = 6589

1983 = 8261

1984 = 4821

1985

1986

1987

1988

1989

1990 = 5,000

1991

1992

1993

1994

1995

1996

1997

1998

1999

2000

2001

2002

2003

2004

2005

2006

2007

2008

2009

2010

2011

2012

2013

2014

2015

2016

2017

2018

2019

2020

2021

2022

2023

2024

2025

2026

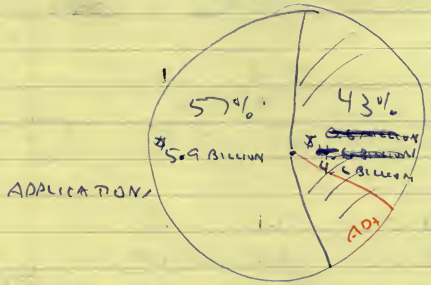
2027

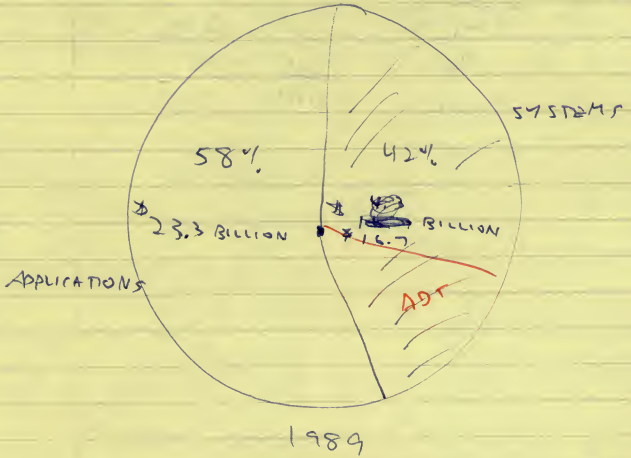
2028

2029

2030

SOFTWARE PRODUCT USER EXPENDITURES
BY TYPE OF SOFTWARE: 1984, 1989





Back up

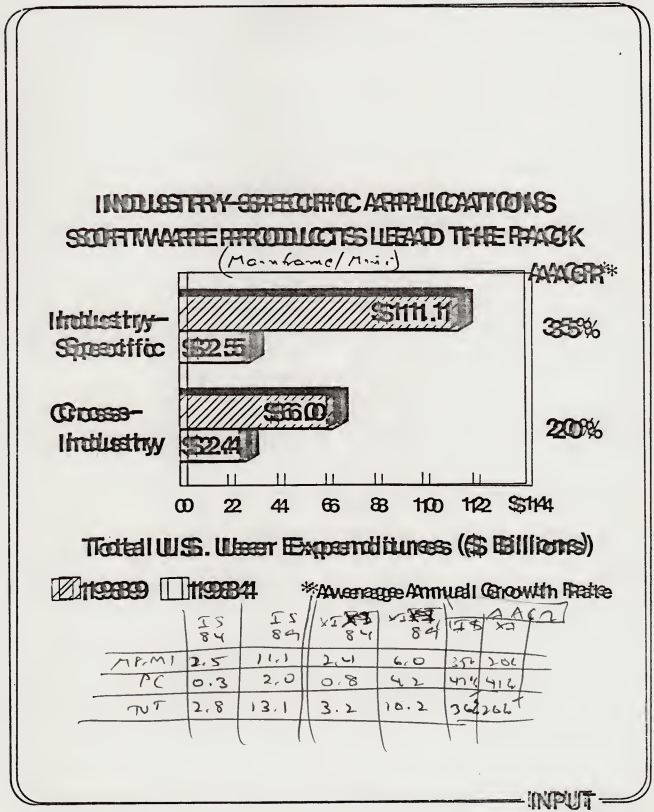
1-4

YSBT

Back up C-10
Add hourly
if needed

	ASW	ADT	ASW+ ADT TOTAL	OTHER TOT SSW	SW
1984					
~~M~~ M-MINI -	4.9	2.1	=		
PC	1.1	0.3	=		
TOT	6.0	2.4	8.4	2.2	10.6
			796	216	1012
1989					
MF-M1	17.1	7.3			
PC	6.2	3.0			
TOT	23.3	10.3	33.6	6.4	40.0
			846	168	1014
%AAGR					
MF-M1	28%	28%			
PC	42%	60%			
TOT	31%	34%			31%

10.6
8.4
2



	IS 84	IS 89				
MP/MI	2.5	11.1	2.4	6.0	35	20
PC	0.3	2.0	0.8	4.2	41	41
TOT	2.8	13.1	3.2	10.2	36	26

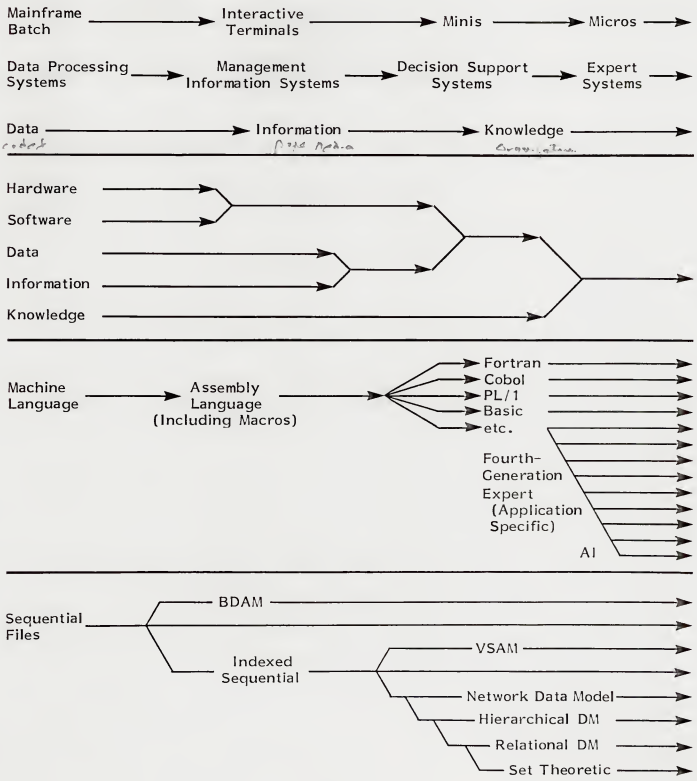
INPUT

SOFTWARE PROTECTION STRATEGIES

	% of Companies
Deliver Source Code	53%
Copyright ~~Software~~	87%
Trade Secret	73%

EXHIBIT IV-3

STRATEGIC TRENDS



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CI

PERSPECTIVE ON COMPUTING

1975 1980 1985 1990

ISV Rev

S.P Rev

SP -/. ISV

I.S. Focus

PC - Bus

4M+

Data Ebol DATA — INFO — Knowledge

DSS

AI

DSS — DMS

TT- Simple Fn Trans Proc

EUC Batch Remote Batch PC IC

Prototyping DSD

Sys Dev

Exhibit V-3.

USSP 7
MSSP

The Fundamental Change in IS Media

I/S Processes

	INPUT	Communications	Calculation/ Manipulation	Storage	Output
Prior to 1800	Paper	Paper	Paper	Paper	Paper
Productivity Improvement 1800–1900	Cash Register (1888)	Telegraph (1837) Telephone (1876)	Adding Machine (1888) Punch Card Equipment (1896)		Typewriter (1867)
Predominant Media 1900–1950	Paper Transactions, Books, Reports, etc.	Paper Correspondence (Mail)	Paper (including punch cards, mathematical tables, etc.)	Paper File Cabinets, libraries	Paper Mag. Rep. Lett.
The Computer "Revolution" 1950 – Present	Terminals, Intelligent Workstations	Satellite, Broadband, Lans, Etc.	Computers	Disk & Tape Storage, Microgrophics	Copie W/ Prin CRT
Predominant Media	Paper	Paper	Electronic	Paper	Paper
Projected 1990's "Electronic Office"	Electronic	Electronic	Electronic	Electronic	Electr

MSSP

Information Services 1970-1989

	Total	Software
1970	3.17	.25
1971	3.71	.35
1972	4.27	.44
1973	4.91	.54
1974	5.65	.66
1975	6.54	.81
1976	7.63	.98
1977	8.80	1.20
1978	10.43	1.48
1979	12.04	1.87
1980	16.97	2.88
1981	22.3	4.2
1982	26.5	5.8
1985	32.2	7.9
1984	39.1	10.6
1985	47.8	14.0
1986	58.3	18.4
1987	71.3	23.9
1988	87.4	30.5
1989	102.5	40.0

	81	82	83	84	85	86	87	88	89
Soft Products	4.2	5.8	7.9	10.6	14.0	18.4	23.9	30.9	40.0
Infy Services	223	24.5	32.2	39.1	47.8	58.3	71.3	87.4	107.5

INFORMATION SERVICES

1970-1989

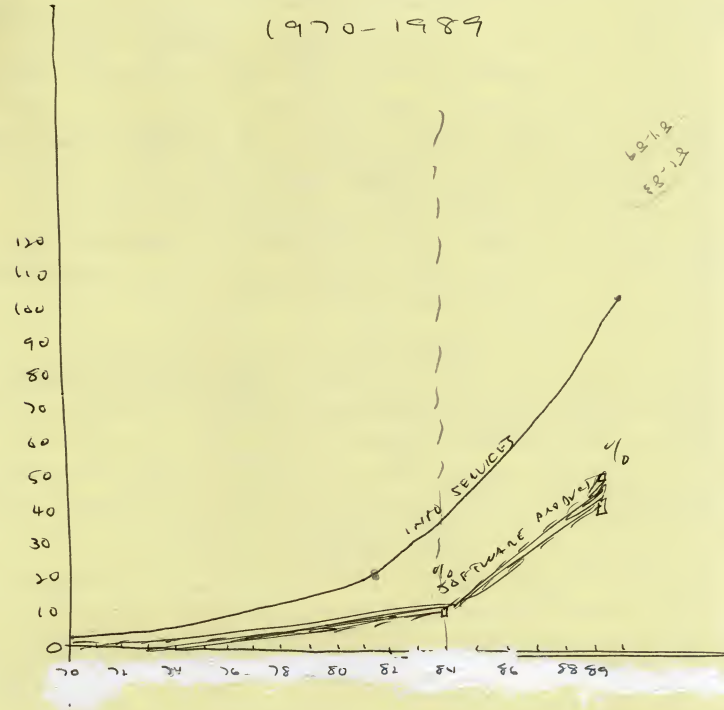

EXHIBIT D-3 (Cont.)

INFORMATION SERVICES INDUSTRY YEARLY PERFORMANCE AND FORECAST,*
1970-1987

INFORMATION SERVICE	($ millions)								AAGR 1970-1987 (percent)
	1980	1981	1982	1983	1984	1985	1986	1987	
Processing Services									
RCS	$ 4,126	$ 5,117	$ 5,683	$ 6,426	$ 7,441	$ 8,733	$10,393	$12,356	20%
Batch	3,091	3,829	4,188	4,645	5,124	5,617	6,102	6,572	11
FM	1,121	1,344	1,537	1,794	2,107	2,494	2,952	3,494	14
Software Products									
Systems	1,401	1,974	2,574	3,401	4,626	6,357	8,646	11,667	29
Applications	1,325	2,191	2,913	3,999	5,714	8,007	11,266	15,856	35
Professional Services	3,751	4,993	5,543	6,277	7,284	8,644	10,403	12,543	17
Subtotal	$14,815	$19,448	$22,438	$26,542	$32,296	$39,852	$49,762	$62,488	19
Integrated Systems	2,157	2,884	3,481	4,248	5,490	7,253	9,492	12,430	N/A
Grand Total	$16,972	$22,332	$25,919	$30,787	$37,786	$47,105	$59,254	$74,918	N/A

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INPUT

EXHIBIT D-3

INFORMATION SERVICES INDUSTRY YEARLY PERFORMANCE AND FORECAST,*
1970-1987

INFORMATION SERVICE	($ millions)									
	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
Processing Services										
RCS	$ 540	$ 670	$ 840	$1,030	$1,260	$1,560	$1,980	$2,390	$2,940	$3,528
Batch	1,060	1,170	1,290	1,410	1,560	1,710	1,880	2,020	2,300	2,486
FM	390	450	510	590	670	770	880	1,030	1,230	1,223
Software Products										
Systems	150	210	270	330	390	490	590	720	890	1,152
Applications	100	140	170	210	270	320	390	480	590	720
Professional Services	930	1,070	1,190	1,340	1,500	1,690	1,910	2,160	2,480	2,932
Subtotal**	$3,170	$3,710	$4,270	$4,910	$5,650	$6,540	$7,630	$8,800	$10,430	$12,041

* 1982-1987 Information Services Forecast

** Integrated Systems Not Included In This Table Prior to 1980

Continued

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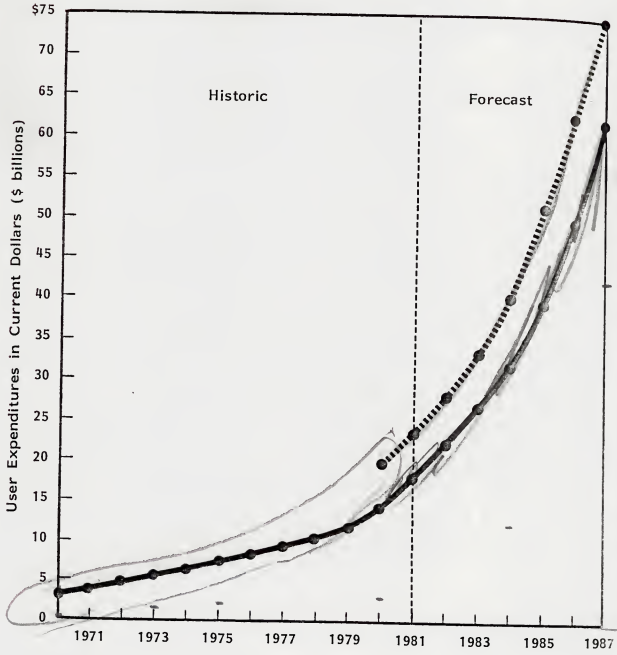
EXHIBIT D-2

TOTAL INFORMATION SERVICES MARKET,
1970-1987



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TOP VENDOR RANKING AND SECTOR MARKET SHARES 1983
— PROFESSIONAL SERVICES

NB misprints

RANK	VENDOR	MARKET SHARE
	FRANCE	
1	Cap Gemini Sogeti	7.6%
2	SG2	5.6
3	SEMA	3.8
4	~~SYSECA~~ ~~Steria~~ Sesa	3.82
5	CISI	3.1
6	Syseca	2.6
7	~~Sopra~~ Steria	1.89
8	~~GFI~~ ~~Answare~~ Sopra	1.68
9	~~G F I~~ Answare	1.56
10	~~SITB~~ GFI	1.50.8
	U.K.	24%
1	Scicon SDL	2.3
2	Hoskyns	2.3
3	EDS	2.3
4	SPL	2.1
5	Datalogic	1.9
6	CAP	1.7
7	~~Atkins~~ Logica	1.6
8	~~F-INT~~ Atkins	1.6
9	~~Logica~~ THORN-EMI	1.5
10	~~F.I.N.~~	~~N/A~~

RANK	VENDOR	MARKET SHARE
	ITALY	
1	Finsiel	15.0%
2	Syntarc	3.8
3	Data Management	2.2
4	Sopin	2.1
5	GE-DA	1.9
6	O-DATI	1.8
7	CDS	1.8
8	GEISCO	1.3
9	Systems and Management	1.1
10	Selesta	0.8
	WEST GERMANY	
1	SCS	6.1%
2	Software AG	6.0
3	Kienbaum	4.1
4	Roland Berger	3.0
5	ADV/ORGA	3.0
6	GEI	2.9
7	EDV-Ploenzke	2.8
8	MBP	2.5
9	PDV	2.3
10	DATEV	1.8

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EXHIBIT V-3

VENDOR ASSESSMENT OF NEW OPPORTUNITY AREAS

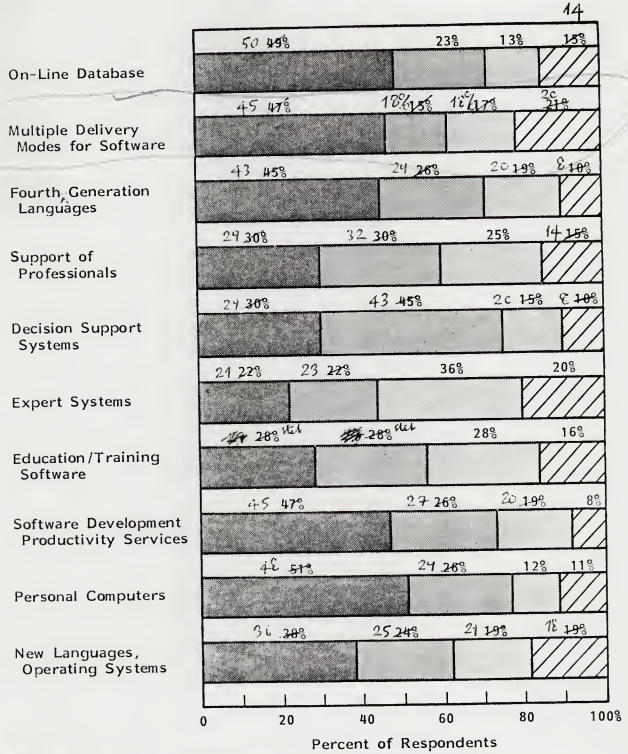

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EXHIBIT III-13

COMPARISON OF U.S. AND WESTERN EUROPEAN
INFORMATION SERVICES MARKET DEVELOPMENT, 1984-1989

MARKET SECTOR		MARKET FORECAST ($ Billions)			
		1983	1984	1984-1989 AAGR	1989
Processing Services	U.S.	$13.0	$14.0	13%	$ 26.0
	W.E.	$ 2.5	$ 2.7	12%	$ 4.7
Software Products	U.S.	8.0	11.0	31	40.0
	W.E.	1.8	2.3	31	9.2
Professional Services	U.S.	7.0	9.0	20	22.0
	W.E.	2.4	2.88	23	8.2
Integrated Systems	U.S.	4.0	6.0	27	19.0
	W.E.	1.5	1.9	26	6.3
Total	U.S.	$32.0	$39.0	22%	$107.0
	W.E.	$ 8.2	$ 9.7	24%	$ 28.4

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Patrick C
2.4.85

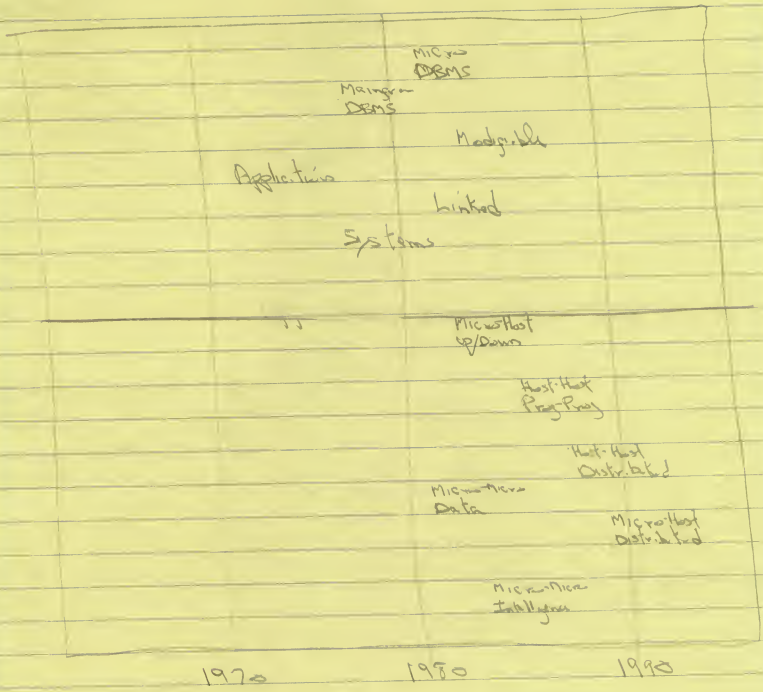
	DM	DM
LOGUR	[illegible]	Low
EMP	IBM	3M
DWP	236	[illegible]

Done much integration two days

CIM SW vendors to date } HW MF - IBM
MF COC
HD
DEC

Integrated SW delivery - MADIX - NCS first then to PRIME
Santa Clara
- BCS
- Integrated Altum - IBM
- Actu. Tool Products - ~~DEC~~ AMDAHL
- ~~Apollo~~
- Reiter SW Sys - Data
- overseas
L.M. Ericsson
Thompson

EVOLUTION OF INTEGRATION



THE FACTORS AFFECTING MICRO-MAINFRAME COMMUNICATION ARE VARIED AND NOT FULLY UNDERSTOOD

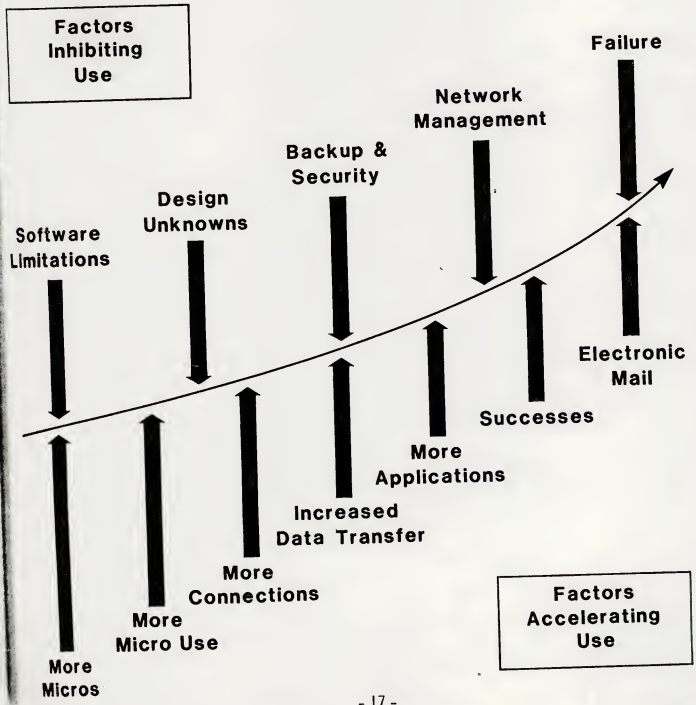


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EXHIBIT IV-4

FACTORS INFLUENCING GROWTH OF
MICRO-MAINFRAME APPLICATIONS SOFTWARE

FACTOR	FACTOR RATING AFFECTING MICRO-MAINFRAME GROWTH High Growth — Low Growth 1 2 3 4 5	IMPORTANCE OF FACTOR*
Customer Factors		
• Influence of End Users	High ← (3.5) → Low	A
• IS Acceptance	High ← (3.0) → Low	A
Market Factors		
• Objective Micro-Mainframe Need	High ← (2.0) → Low	A
• Early Implementations	Success ← (3.0) → Failure	A
• Industry-Specific Applications Available	Many ← (4.0) → Few	B
Technical/Product Factors		
• Acceptable Technical Solutions	(Yes) ——— No	A
• Interactive Product Breakthrough	Yes ——— (No)	B
• Old Package Micro-Mainframe Retrofits	Many ← (3.5) → Few	A
• Integrated Mainframe Packages Installed	(Few) ← → Many	B
• New Micro-Mainframe Packages Available	Many ← (3.0) → Few	B

( ) = INPUT's assessment of situation in medium term (2-4 years)

* A = Important, B = Less Important.

Rating: (1) = Causing Higher Growth, (5) = Causing Lower Growth.

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Integration/Distribution

Approx Year: Initial Offering; general acceptance

- Program families (protocols, calls, etc)
  - Applications (e.g., financial) — 1975; 1980
  - Systems software (e.g., data center operations) — 1980; 1985
  - Linked ~~families~~ application families — 1983; 1987
- System Software/Application Software
  - Mainframe DBMS/Applications — 1980; 1985
  - Micro DBMS/Applications — 1982; 1987*
  - Modifiable packages — 1983; 1988?

~~Mainframe~~

- ~~Mainfram~~ ~~Mainframe~~ Host to Host
  - Program to program (e.g. LU1.6) — 1985; 1988
  - Distributed DB (across hosts) — 1986; 1990
- Micro-Micro
  - LAN ~~applications~~: Data — 1981; [redacted]?
  - "LAN" ~~applications~~: Intelligence — 1985; 1987*
- Micro-~~Mainframe~~ Host
  - Data download/upload (application) — 1983; 1987*
  - Distributed DB — 1988; 1990

show time lines

* Convergence

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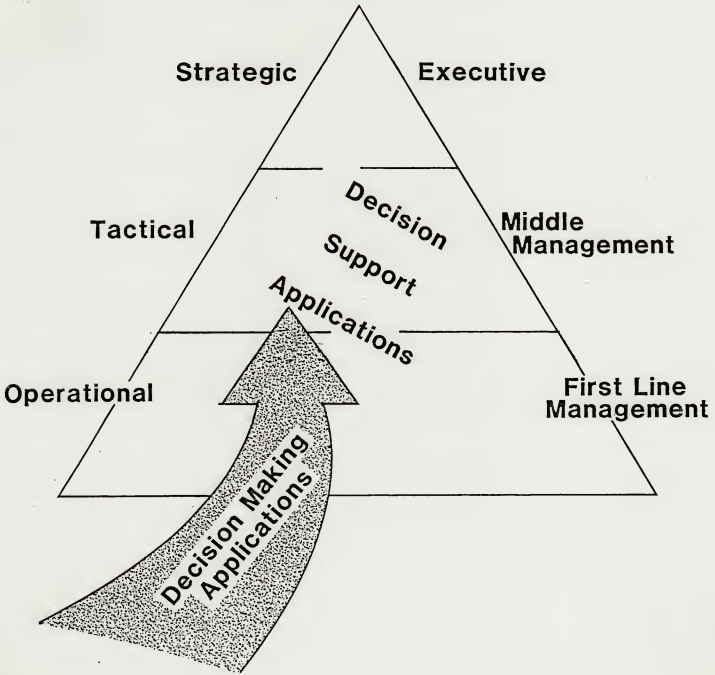
EXHIBIT II-3

DECISION SUPPORT/DECISION MAKING IN THE ORGANIZATION



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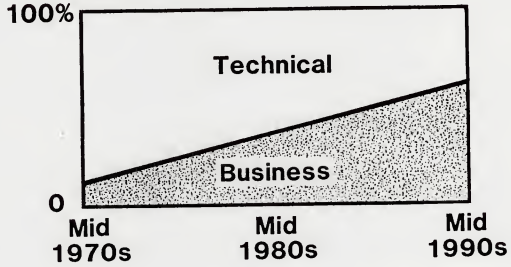
BUSINESS SKILLS ARE BECOMING MORE IMPORTANT



INPUT

EVOLUTION OF USERS AND APPLICATIONS

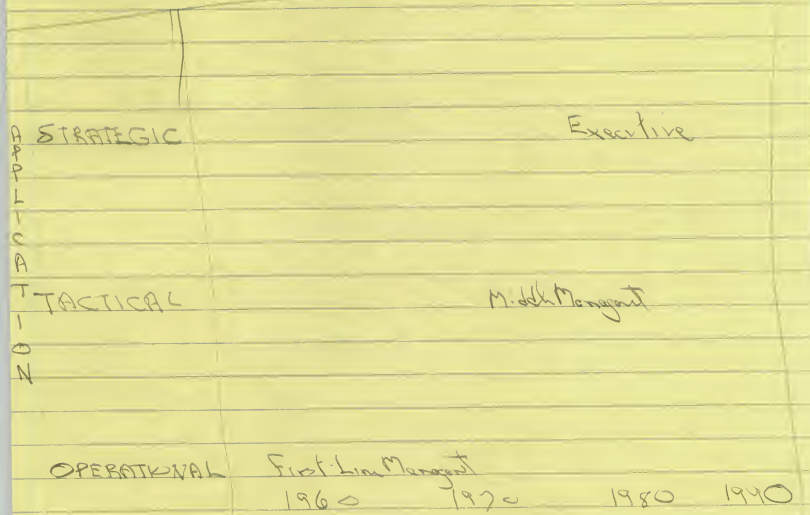


EXHIBIT II-8

COMPUTER HARDWARE EVOLUTION

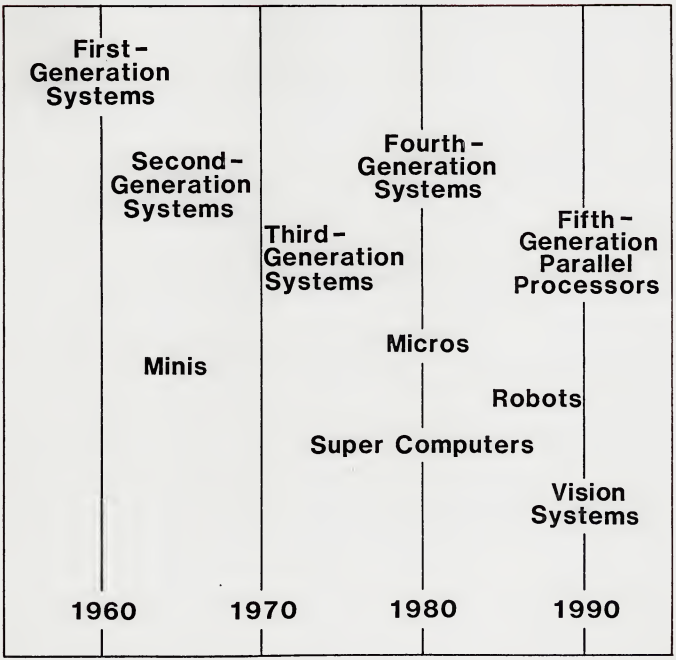


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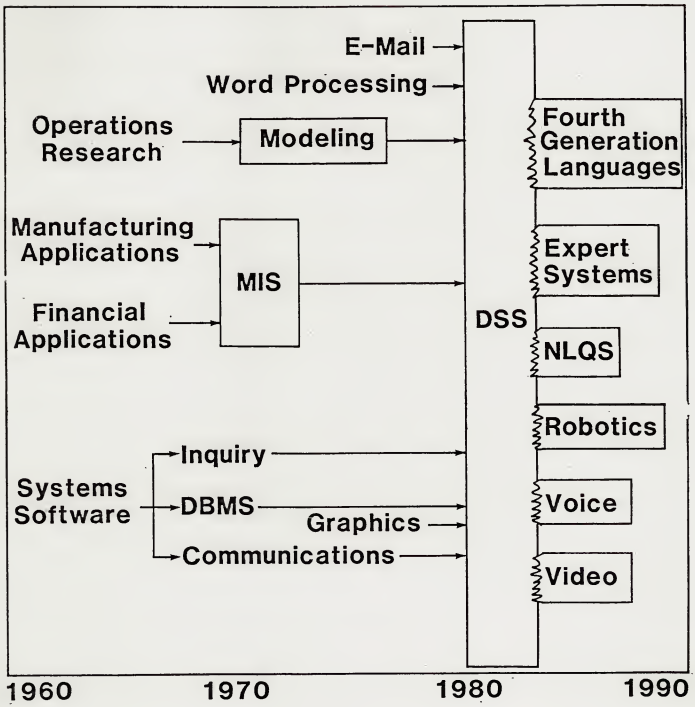
EXHIBIT II-7

EVOLUTION OF SOFTWARE



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Special Report

Integration

Putting the pieces together

By Paul Gillin
CW Staff

Just as "automate" was the application developer's bugle call for many years, today the watchword is "integrate."

Although integration is loosely defined and widely misused, it is clear that large computer users are increasingly demanding new ways to look at and manipulate data. "It's no longer enough to build an application for one purpose and expect it to continue to perform that," said David Dell, director of research at the Diebold Group, Inc., a management consulting firm based in New York. "We have to anticipate that information will be wanted for purposes for which it was not originally designed."

But just what constitutes integration and how much integration a user needs are two thorny issues. Rudimentary forms of integration have been available for several years, but many experts agree that the technology is still immature. One of the barriers to achieving true integration has been the roots that many applications systems still have in batch processes of the past.

"When I first started building systems, the computer people sent somebody they called a systems analyst out to the user community to, in effect, automate what they did," said Naomi Lee Bloom, senior principal in the consulting division of American Management Systems, Inc. "We didn't have to think about the data. What we usually ended up with was a bunch of automated systems that had the same basic flow as manual systems."

Dell added, "Originally applications were designed to do a single job well. Now much more attention is being focused on the advantages of integration in terms of lowering the costs of design coding, improving productivity and being able to move information efficiently from one application to the next."

Unfortunately, the process of retooling batch systems to include integrated features has been slow and difficult. And because technologies are changing so quickly, a standard for integration has not yet emerged. Dell noted. "The [application] software houses are not the only ones in the integration business," he said. "The data base people set some [standards], the major hardware vendors set some and everybody wants to integrate with [Lotus Development Corp.'s 1-2-3].

"People want to integrate between various functions and also [between the mainframe and the personal computer]," he noted. "Add to that [the complexity of different vendors coming up with approaches to integration in their product lines and the question becomes: How do you integrate different kinds of integration?"

The topic of integration has gained importance in recent years due to two major factors: the need for improved programmer productivity and end users' desire to apply some of the imaginative techniques to corporate data that have been developed for micros.

"The market now understands that the Tower of Babel is very costly," Bloom said. "The user community is very involved, and they don't want to learn 13 different command structures for 13 different applications. The users are forcing integration."

> *'[Users] don't want to learn 13 different command structures for 13 different applications. The users are forcing integration.'*
>
> — Naomi Lee Bloom
> American Management Systems, Inc.

Software vendors have reacted with several new approaches, each of them claiming to be fully integrated. However, Bloom, whose firm also sells integrated applications software, admitted, "Vendor marketing far outstrips delivery. Vendors are better articulators than we are deliverers, We are our own worst enemies."

Wayne Pierce, manager of software intelligence at Arthur Andersen & Co. in Chicago, agreed. "Vendors have created an environment that confuses the issue for purchasers in order to differentiate their own products," he said. "By saying they're integrated, [the vendors] imply that things work very closely between one another, that data is shared. But in most cases it is still simply passed. Each application still possesses its own files, and that's a very significant difference between integrated and interfaced applications."

The approaches being taken to horizontal integration today can roughly be split into two types: data base integration and data access integration.

Integrated access is the most popular approach on the market, with adherents like McCormack & Dodge Corp. (M&D), Walker Interactive Systems, Inc., Data Design Associates, American Management Systems, Inc. and Hogan Systems, Inc. The approach is not based on a specific data base management system (DBMS) but rather provides for consistent operations across files.

With M&D's Millennium technology, for example, "The user's ability to converse with the system is identical," said Owen Boyd, M&D marketing manager for tools. "You can pull data from multiple files, cross-edit and cross-check, update and write back to files, and the files are always updated in sync. The processes define the relations, and this can change as the processes change."

Most vendors who have taken this approach have changed the online portions of their software to reflect this consistency but have not fully rewritten the batch modules. "Batch now does not do true processing between programs," Boyd said.

Tighter integration can be achieved if applications are designed around a common DBMS using a single development system, an approach that is advocated by data base vendors like Cullinet Software, Inc. Cullinet's manufacturing modules, for example, share one common IDMS data base, a structure that offers improved functionality and performance by minimizing the transfer of data. "Cullinet is trying to control the tools that control data and also the tools to create on-line and batch applications," Pierce said. "That is a more all-encompassing approach to integration."

On the other hand, a data base approach is more expensive because it requires a commitment to a single vendor and the purchase and maintenance of a DBMS and related systems software. Cullinet also claim that outside of high-volume processing, data base integration does not offer much more function for the far higher cost.

A third but increasingly rare option involves building interfaces between existing application modules to perform some rudimentary data passing. The option is by far the cheapest and requires the least commitment to a specific vendor. However, it is a far cry from integration.

Although much talk has revolved around various approaches to integration, many observers agree that a basic issue has been ignored, namely, how

See INTEGRATE SR/10

Integration option: Add to existing software

Organizations could effectively achieve many of the benefits of integration for less money by putting products on top of existing applications software that offers consistent data definitions, some say.

Some available products include query languages, report writers, fourth-generation languages, application generators, data dictionary systems and micro-mainframe links.

"Some of our clients are using [Information Builders Inc.'s] PC/FOCUS as a front end to their applications software as a quick integration," said Jack Shemer, president of Shemer Associates, Inc., a Cambridge, Mass.-based consulting firm. "They're using it to access their data and then they're using it to add capabilities that don't exist in their software. You can get some of the benefits of integration through a sidekick package. They've got an excellent integration for a task, but they haven't done anything on a total program."

Daniel Tan, a principal at Index Systems, Inc., a Cambridge, Mass.-based consulting firm, said many integration projects fail because businesses focus too much on the technology and too little on the type of integration they need.

Newer technologies like fourth-generation languages can be used to solve some of the problems, Tan said, but that looking for a single integrated system to solve any problem "is the wrong approach." He said, "Once you decide what the organization's problem is, then it's time to take a look at the technology."

Integrated software key to firm's system upgrade

MILPITAS, Calif. — When modem maker Racal-Vadic, Inc. here outgrew its batch processing system three years ago and set out to put together a replacement system, it centered its plans around obtaining integrated, data-base-oriented software.

Racal-Vadic

The firm had purchased a Sperry Corp. 9030 mainframe and installed financial and manufacturing software in 1979, when it was a $19 million/year company with a rather simple, centralized manufacturing organization. Since then, Racal-Vadic has expanded its revenue to $100 million annually, added manufacturing plants and distribution centers and opened regional offices throughout the country.

Early in 1982, Racal-Vadic's top management committed itself to a five-year MIS plan to bring up an on-line system that could keep up with the company's expansion.

The plan dictated that software applications for separate departments run off a centralized data base, according to Robert Swetavage, the firm's MIS manager. "In a high-growth, multiplant environment like ours, we believe that maximum integration of our applications across the company is crucial to our future success," Swetavage said.

> "The advantages of the integrated approach include more timely and consistent data [and] greater productivity [and] reduced data redundancy."
>
> Robert Swetavage, Racal-Vadic

With such a setup, managers in financial and manufacturing departments can access at will current data from all divisions of the company. Having current information from throughout the firm allows them to respond quickly to changes in the marketplace, to evaluate immediately the effects of business decisions and to stay competitive in general, Swetavage said.

Racal-Vadic issued a request for proposals to software vendors and, after considering the replies it got, purchased Cullinet Software, Inc.'s IDMS data base and modules of the vendor's financial and manufacturing systems.

The firm chose Cullinet because it offered integrated data base and applications software, Swetavage said. "Everyone else used the [data base management system] as a vehicle for implementing applications, with little or no integration involved."

Modular design appealing

Cullinet also offered an integrated data dictionary, a fourth-generation language and some other tools Racal-Vadic wanted, along with a modular design that appealed to the firm, he said. "I didn't have to bring everything in at one time."

Racal-Vadic signed a contract for the software in July 1982. In September, it ordered a 4M-byte IBM 4341 for delivery in February 1983.

Even before the mainframe was on order, the firm began sending staff members to Cullinet's training centers to prepare for the data base and the firm's initial software application, general ledger, both slated for installation in March 1983.

The firm then linked two terminals in its headquarters here to a mainframe at a Cullinet data center in Westwood, Mass., that was running a copy of the general ledger software. Racal-Vadic established the link because it had to make changes to the software's chart of accounts but did not have a mainframe on which to do the work. Over the same communications link, DP staff members received additional training on the software and ran some tests.

As planned, Racal-Vadic installed the 4341 in its headquarters in February and brought up the data base and general ledger software in test mode during February and March. On April 1, the software was in use, recording finances for Racal-Vadic's new fiscal year, which began that day.

Swetavage said the firm brought up its general ledger before other financial and manufacturing modules partly because it needed the software running at the start of the fiscal year. If it had come up later during the

See UPGRADE SR/10

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much integration users really need.

"In some ways, I would try to dissuade people from integrating right away because I think there may be a tendency to overintegrate where it's really not valuable," said Daniel Pfau, of Index Systems, inc. in Cambridge, Mass.

Boyd added, "I've found that customer wants are usually totally unrealistic compared to what they can really get."

Large-scale integration in most cases requires a near-total redesign of existing software and may entail even greater expense if a DBMS is involved.

For that reason, experts agreed, companies should be questioning seriously just how much integration they need.

Deciding how much integration is needed "is the biggest question right now, and there isn't any right or wrong answer," Pierce said. He added that users often "overestimate their ability to implement the kind of integration that they would like. And it's more expensive than they expect it to be," he said. "Rarely do you see people able to spend the amount of time and resources to achieve it."

Integration cannot be effectively achieved through simply purchasing software, Bloom pointed out. In the perfect world, a company would be able to close down for a while, analyze its business strategy and create an information architecture and systems strategy based on that analysis. Then the software would be designed by one superanalyst taking into account possible future uses of information as well as current uses. The scenario is implausible, Bloom said. "But it does help to go through the mental exercise of shutting the business down and thinking through what you would put in place in the ideal situation."

Thinking about integration has to begin with the realization that different groups use the same information in different ways. "In a product data base, integration is conceptually thinking about the product, determining what the corporation needs to know about it and coming up with a data model that allows different users to look at the product as though they were the only ones looking at it," Bloom said.

Dell added, "There are major benefits to determining what can be integrated and what doesn't need to be integrated, especially as more people and functions are involved."

UPGRADE from SR/8

year, Racal-Vadic would have to maintain financial data for one year on two systems.

In addition, general ledger set the stage for future financial and manufacturing applications the firm planned to bring up. "We viewed [it] as a reference that would create system disciplines for other integrated applications to comply with as we brought them on," he said.

Last summer, the firm installed the material modules of its manufacturing system — Cullinet's bill of materials, inventory control and materials requirements planning. The modules went into use in September, and the firm has since begun to realize the benefits of the integrated system, according to Swetavage.

"The advantages of the integrated approach include more timely and consistent data, greatly reduced data redundancy and one set of parts master information for all departments in the company," he said.

The only process still running on the Sperry Univac are order entry and accounts receivable. Racal-Vadic plans to install Cullinet's order entry software on the IBM system this spring and to bring up accounts receivable sometime afterward. A service bureau processes the firm's accounts payable, and a bank does its payroll.

Throughout the implementation to date, Racal-Vadic has evaluated its business practices in relation to the way its software is set up, Swetavage said. "In some cases, we've [asked] to adapt to modify our procedures to conform to the package."

Fine level of detail

Cullinet's general ledger, for example, provided several more positions for data in its chart of accounts than the software that ran on the Univac did. Racal-Vadic modified its procedures to take advantage of the software, bringing a finer level of detail to its reporting.

The firm also introduced certain data entry procedures and disciplined computerized documentation to the users. Swetavage said the integrated software requires that users enter data correctly and consistently, because if they enter various pieces, the data base spreads that change to data files throughout the company.

Users have responded well to the system but have had trouble with Culprit, the IDMS report writer. Culprit is not easy for end users to learn, Swetavage said. "My programmers can use it better than my users." In turn, the programmers do all report formatting, a task the MIS department would like to relegate to end users.

Cullinet offers On-Line English, an easier to use report-writing utility, but Racal-Vadic has shied away from it because it takes up too many system resources.

As users mature on the IDMS system in the coming years, the firm will look for report writers they can operate, Swetavage said.

Racal-Vadic's other plans include installing Cullinet's master production schedules and shop-floor control software this fall and bringing up a purchasing module when Cullinet releases it. Further in the future, the firm wants to obtain accounts payable and cost control modules.

EXHIBIT IV-1

COMPARATIVE ECONOMIC STATISTICS - 1983

	France	Italy	U.K.	West Germany	Total	U.S.
Gross National Product ($ Billions)	$510	$388	$445	$648	$1,991	$3,250
Current Level of GNP Growth	+1.9%	+1.4%	+2.6%	+0.6%	-	+7.6%
Size of Information Services Business	2.94	1.08	2.15	2.10	8.27	32.60
Percent of GNP	0.58%	0.28%	0.48%	0.32%	0.42%	1.00%
Total Working Population (1982) (Millions)	22.8	22.6	25.9	26.9	98.2	110.2
Total Employed in Information Service Industries (Millions)	11.9	10.4	14.5	13.0	49.8	67.7
Percent Service Employees of Total Working Population	52%	46%	56%	48%	51%	61%
Current Inflation Rate (Percent)	+9.3%	+10.5%	+5.3%	+2.6%	-	+3.8%

Source: EUROSTAT and INPUT estimates.

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YSBI

T. – Tyl
1-25-85

MSA really struggling
w: DSO, M.M

CN
custom
unloading P trees

distr from MF to PC
what mix

regenerate way to

FIN MFR — I = Structure of applications

J.PDEC

Nasp — BCS MSIB - John Madden

INPUT N = Structure of SW - Appl Categories
eg YSC – more detail

What is an expert system?

1 Day for YSBI & TT
Mtg (10)

YSBI: Issue = SSW → ASW

11

boring copiers

25-30

IBM Preview VSBI
Jac Hennicke
Bill Eager
Rick P
2-5-85

IBM Issue how rapidly ADT merging into ASW

Bonnie

terminals (2.9) + 1981 % = 4% or 6%

I = what PC used for?
- dist load %
- 3270 inquiry %

(45) ASW I.

(48) Place % of ASW

(49) Examples of vendor

(61) Split MP + MINI

(65) MINI Mkt - remain? SMALL, LG micro

MSA - Add NetO+D, CNET or drop
+ telemen

CTG-CNET

CNET → MRP = similar apps — who in MRL has adv similar to CNET?

Call HARD CODE US ADDL DEV (WHICH?) which = wave of future Both

Add M+A chart

→ a Boeing new VFW

XSBI-TODO 2-4-83

~~Text to DSD, etc~~

~~MSDS data~~

DIM Arrows - M.S. Defn

~~DSSP~~ ~~Time line charts~~

~~A.R. IS hard copy (A) AFB~~

ALL NEXT

JK Add IS organ showing Appl Develop (30)

~~Pabek~~ ~~Text - CIA~~

~~Com CIM to AFB~~

Text (TV) AFS-SP what="other" category

~~Add PtA section~~

~~Text - Europe~~

Tues ~~Integrated DAMS-ASW and Growth~~

Tues ~~Div data / distrib data~~

Tues Kudrak effect

✓ VFW SP Acctg vendo-

~~IFV 1777-82 (1A)~~

RR ~~XBSS forecasts for PtA sects~~ 1777/

NP This is DSS chart
Office Reg

Doug ~~Bind - Cloth - 3 hole~~
~~Exec Book~~

SK (35) Diff between MCS + T-ms, Pt-DSS

IBM INFORMATION SERVICES - ORGANIZATIONAL UNITS

IBM INFORMATION NETWORK - IIN

THE IBM INFORMATION NETWORK IS A NATIONWIDE COMPUTER-BASED NETWORKING AND REMOTE COMPUTING SERVICE.

THE MISSION

IT IS RESPONSIBLE FOR DEVELOPING, OPERATING AND MARKETING A COMPETITIVE, NON-REGULATED TELECOMMUNICATIONS SERVICE THAT COMPLEMENTS THE IBM PRODUCT LINE.

INFORMATION PROGRAMMING SERVICES - IPS

INFORMATION PROGRAMMING SERVICES (IPS) DEVELOPS HIGH QUALITY APPLICATIONS AND PRODUCTIVITY SOFTWARE PRODUCTS FOR DISTRIBUTION THROUGH APPROPRIATE MARKETING CHANNELS.

THE MISSION

IPS DESIGNS AND BUILDS SOFTWARE PRODUCTS AND ALSO ACQUIRES THEM FROM OUTSIDE IBM TO MEET CUSTOMER APPLICATION NEEDS FOR SYSTEMS RANGING FROM THE IBM PERSONAL COMPUTER TO HIGH-END PROCESSORS. THESE PRODUCTS ARE SUPPORTED BY A VARIETY OF OFFERINGS - FROM BASIC DOCUMENTATION AND COMPUTER-ASSISTED SELF-INSTRUCTION, TO DIRECT TELEPHONE ASSISTANCE. TYPICAL PRODUCTS ARE MAPICS, PROFS, ISPF, BMS/PDS AND INFO SYSTEM.

INFORMATION SYSTEMS SERVICES - ISS

INFORMATION SYSTEMS SERVICES DEVELOPS CUSTOM SOFTWARE AND PROVIDES CONSULTING AND SPECIAL EDUCATION OFFERINGS FOR ALL NAD AND NMD CUSTOMERS.

THE MISSION

INFORMATION SYSTEMS SERVICES TEAMS WORK SIDE-BY-SIDE WITH CUSTOMER PERSONNEL TO DEVELOP CUSTOMIZED SOFTWARE AND TO HELP INCREASE THE CUSTOMER'S OWN SKILLS AND SELF-SUFFICIENCY. THE SERVICES' APPROACH TO ALL PROJECTS IS HIGHLY DISCIPLINED AND HAS PROVEN TO BE EXTREMELY SUCCESSFUL OVER THE LAST DECADE. EXPERIENCED SERVICES PERSONNEL WORK ON MORE THAN 200 CUSTOMER PROJECTS ANNUALLY IN A WIDE VARIETY OF INDUSTRIES.

ATTACHMENT A

SOFTWARE INDUSTRY: OVERVIEW, ISSUES AND TRENDS

I. Overview of the Information Services Industry

A. Size and Growth by Mode

1. Processing Services

2. Turnkey Systems

3. Professional Services

4. Software Products

B. Issues and Trends

II Software Products

A. The Software Pyramid

1. Operating Systems

2. Systems/Interface

3. Development Tools

4. Languages

5. Application Tools

6. Applications

B. Size & Growth

1. Applications vs. Systems

2. Packages vs. Custom

3. Support and Training

C. Pricing Trends

1. One Time Sales
2. Lease/Rental
3. Maintenance
4. Discounting

D. Distribution Trends

1. Direct
2. Mail
3. Dealer
4. Electronic

E. Markets

1. Cross-Industry (especially financial)
2. Vertical (especially production planning and control)

F. Market Influences

1. Electronic Office
2. Information Centers
3. Workstation

G. Technical Influences

1. Price/Performance of Hardware
2. Mainframe-to-Micro
3. Price/Performance of Storage
4. "Kodak" Effect
5. Increasing connectivity

III Forecast Periods

A. Centralization

1. Operating Systems

2. Data Base Systems

B. Integration

1. Languages, DSS

2. Industry Turnkey

3. Applications Packages

C. Differentiation

1. Integration Overlap

2. Data/Information/Knowledge

D. Mechanization

1. Hardware/Software/DIK

2. Custom Products

INPUT

PARK 80 PLAZA WEST-1, SADDLE BROOK, NEW JERSEY 07662 (201) 368-9471

JAN 24 1985

January 23, 1985

Mr. Jack Keen
INPUT
1943 Landings Drive
Mountain View, CA 94043

Dear Jack:

We have been commissioned to do an overview of the Application Software Market: 1985-1990 for the IBM IPS Division. The presentation is a foil one running 2½ hours in Atlanta, Georgia Tuesday February 12. However, IBM is coming here Tuesday February 5 to review. Thus we have to have it done by then, only 12 days away (counting Saturday and Sunday).

The mission of IPS is to:

"Design and build software products and also acquire them from outside IBM to meet customer application needs for hardware ranging from the IBM PC to the high-end processors."

Our presentation is to give them the context from our point-of-view as to what's happening in this area over the next five years. The audience will be senior IBM Marketing types who are assembling in Atlanta to work out their stratgic plan for IPS. In a sense, our presentation is a preamble, food for thought, meaty overview that will assist them in their planning sessions immediately following our presentation.

The outline of the presentation that we discussed with IPS is attached, with some expanded and explanatory notes. Their two prime areas of interest at this time are:

- Cross-industry Financial Function Applications.
- Vertical Industry Manufacturing everything up-to and including the integrated factory.

As we review, each major piece of the application software industry, we should relate as much as possible specific implications, issues, trends in that piece that directly affect one or both of the above two areas of interest.

IBM has also requested that we spend that last fifteen minutes of the presentation talking about this market in Europe, essentially highlighting where we see the differences between the U.S. and Europe.

Also our presentation should talk to Market segments of users, i.e.

- Large (expanded F1000).
- Medium.

- Small (less than 20 employment).

And indicate what is happening in these segments and raising issues to be considered by IPS.

In the course of our discussion, two additional points were made to be integrated into the presentation.

1. Application Software Trends, Issues, etc. in the 1975-80 period, the 80-85 period and the 85-90 period. This gives the audience a sense of history, and continuity of change so as to better understand what we will say about the 85-90 period.

2. That the classical software pyramid may be subject to taking vertical slices through if reflective of such developments as micro-to-mainframe software, etc.

Regards,

Warren

WSP/lcg
Enclosure

WP
FYI
Joe H. Liked this and was impressed that we did it.

DRAFT

SOFTWARE INDUSTRY: OVERVIEW, ISSUES AND TRENDS

I. Overview of the Information Services Industry

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  - 1. Processing Services
  - 2. Turnkey Systems
  - 3. Professional Services
  - 4. Software Products
- B. Issues and Trends

II Software Products

- A. The Software Pyramid
  - 1. Operating Systems
  - 2. Systems/Interface
  - 3. Development Tools
  - 4. Languages
  - 5. Application Tools 4GLs
  - 6. Applications
- B. Size & Growth
  - 1. Applications vs. Systems
  - 2. Packages vs. Custom
  - 3. Support and Training

C. Pricing Trends

1. One Time Sales

2. Lease/Rental

2a → VALUE PRICING, etc

3. Maintenance

4. Discounting

D. Distribution Trends

what about software piracy, especially at micro level?

1. Direct

2. Mail

3. Dealer

4. Electronic (software distributors to micros)

E. Markets

1. Cross-Industry (especially financial)

2. Vertical (especially production planning and control)

F. Market Influences

1. Electronic Office

2. Information Centers

3. Workstation

G. Technical Influences

~~1. Price/Performance of Hardware~~ out

2. Mainframe-to-Micro

~~3. Price/Performance of Storage~~ out

4. "Kodak" Effect

5. Increasing connectivity

Issues:
- buy the software get the hardware almost free
- throwaway software
- Used Software (ie older versions)

III Forecast Periods

A. Centralization

1. Operating Systems

2. Data Base Systems

B. Integration

1. Languages, DSS

2. Industry Turnkey (including tools & Aids)

3. Applications Packages

C. Differentiation

1. Integration Overlap

2. Data/Information/Knowledge

D. Mechanization

1. Hardware/Software/DIK

2. Custom Products